

IN THE CLAIMS:

1 1. (CURRENTLY AMENDED) An intermediate network device having a plurality of
2 ports for sending and receiving network messages to and from entities of a computer
3 network at least some of which are segregated into a plurality of virtual local area
4 network (VLANs) defined within the computer network, the intermediate network device
5 comprising:

6 a compact-Generic Application Registration Protocol (GARP) VLAN
7 Registration Protocol (GVRP) application component associated with a selected port, the
8 compact-GVRP application component having:

9 a GARP Information Declaration (GID) component configured to maintain
10 VLAN registration state for the selected port in response to receiving attribute events for
11 the VLANs;

12 a compact-GVRP encoder/decoder unit; and

13 a GVRP protocol data unit (PDU) message generator, wherein

14 the compact-GVRP encoder/decoder unit is configured to compute encoded
15 values, in accordance with a number base conversion encoding algorithm that encodes a
16 plurality of attribute events that are each associated with a different VLAN of a given set
17 of VLANs into each encoded value, and

18 | the GVRP PDU message generator is configured to load ~~loads~~ each encoded value
19 | into a separate field within a single attribute structure of a single GVRP PDU message,
20 | wherein the encoded values computed for all of the VLANs defined within the computer
21 | network are loaded within the single attribute structure of the single GVRP PDU message
22 | for transmission from the selected port.

1 | 2. (CURRENTLY AMENDED) ~~An~~ The intermediate network device as defined in claim
2 | 1 wherein the number base conversion encoding algorithm is a base-5 to base-2 number
3 | base conversion encoding algorithm.

1 | 3. (CURRENTLY AMENDED) ~~An~~The intermediate network device as defined in
2 | claim 2 wherein the number base conversion encoding algorithm is
3 | $((((E_X \times 5 + E_{X+1}) \times 5 + E_{X+2}) \times 5 + E_{X+3}) \times 5 + E_{X+4}) \times 5 + E_{X+5})$ and wherein E_X
4 | corresponds to the attribute event for the first VLAN in the set, E_{X+1} corresponds to the
5 | attribute event for the second VLAN in the set, E_{X+2} corresponds to the attribute event for
6 | the third VLAN in the set, E_{X+3} corresponds to the attribute event for the fourth VLAN in
7 | the set, E_{X+4} corresponds to the attribute event for the fifth VLAN in the set, and E_{X+5}
8 | corresponds to the attribute event for the sixth VLAN in the set.

1 | 4. (CURRENTLY AMENDED) ~~An~~The intermediate network device as defined in claim
2 | 1 wherein the compact-GVRP encoder/decoder unit is configured to decode an encoded
3 | value contained in a field in a compact-GVRP PDU message, that was encoded using the
4 | number base conversion encoding algorithm, to yield attribute event information for a set
5 | of VLANs.

1 | 5. (CURRENTLY AMENDED) ~~An~~The intermediate network device as defined in claim
2 | 1 wherein the compact-GVRP application component is configured to generate and send
3 | a GVRP PDU message containing a just_kidding message.

1 | 6. (CURRENTLY AMENDED) ~~An~~The intermediate network device as defined in claim
2 | 5 further comprising:
3 | a leave timer;
4 | a just_kidding timer; and
5 | a just_kidding state machine,

6 wherein the just_kidding state machine is configured to start the leave timer and
7 to restart the just_kidding timer upon sending the GVRP PDU message containing the
8 just_kidding message.

1 | 7. (CURRENTLY AMENDED) ~~An~~The intermediate network device as defined in claim
2 | 6 comprising:

3 a leave_all timer; and

4 a leave_all state machine,

5 wherein the leave_all state machine is configured to enter an active state upon
6 sending the GVRP PDU message containing the just_kidding message and the compact-
7 GVRP application component is configured to generate and send a GVRP PDU message
8 that is configured to cause network entities that receive it to respond with one or more
9 GVRP PDU messages.

1 | 8. (CURRENTLY AMENDED) ~~An~~The intermediate network device as defined in claim
2 | 7 wherein the leave timer is set to a high value relative to the leave_all timer.

1 | 9. (CURRENTLY AMENDED) ~~An~~The intermediate network device as defined in claim
2 | 7 comprising:

3 a mode selection unit configured to be in one of a compatible mode, a fast
4 compact mode or a slow compact mode,

5 wherein the mode selection unit is configured to enter the compatible mode if
6 after the compact-GVRP application component sends the GVRP PDU message
7 containing a just_kidding message and the mode selection unit is either in the fast
8 compact mode or the slow compact mode and the compact-GVRP application component
9 receives a conventional GVRP PDU message.

1 | 10. (CURRENTLY AMENDED) ~~An~~The intermediate network device as defined in
2 | claim 7 comprising:

3 | a port partner variable configured to hold a source identifier,
4 | wherein the compact-GVRP application component is configured to place the
5 | source identifier in the port partner variable upon processing a received GVRP PDU
6 | message containing a negotiation message with a source identifier.

1 | 11. (CURRENTLY AMENDED) ~~An~~The intermediate network device as defined in
2 | claim 10 wherein the compact-GVRP application is configured to enter a slow compact
3 | mode upon processing a received GVRP PDU message containing a negotiation message
4 | with a source identifier that does not match the content of the port partner variable.

1 | 12. (CURRENTLY AMENDED) ~~An~~The intermediate network device as defined in
2 | claim 10 wherein the compact-GVRP application is configured to enter a fast compact
3 | mode upon processing a received GVRP PDU message containing a negotiation message
4 | with a source identifier that matches the content of the port partner variable.

1 | 13. (CURRENTLY AMENDED) ~~An~~The intermediate network device as defined in
2 | claim 1 wherein the compact-GVRP application component is configured to generate a
3 | mixed format GVRP PDU message containing a conventional attribute structure as well
4 | as fields loaded with the encoded values.

1 | 14. (CURRENTLY AMENDED) In an intermediate node having a plurality of ports for
2 | sending and receiving network messages to and from entities of a computer network at
3 | least some of which are segregated into a plurality of virtual local area network (VLANs)
4 | defined within the computer network, a method for conveying VLAN membership
5 | information comprising ~~the steps of:~~

6 for a given set of VLANs defined within the computer network, computing an
7 encoded value, in accordance with a number base conversion encoding algorithm that
8 encodes a plurality of attribute events that are each associated with a different VLAN of
9 the given set of VLANs into each encoded value; and

10 loading each encoded value into a separate field within a single attribute structure
11 of a single GVRP protocol data unit (PDU) message, wherein encoded values for all of
12 the VLANs defined within the computer network are loaded into the single attribute
13 structure of the single GVRP PDU message for transmission at one or more ports in the
14 plurality of ports.

1 15. (CURRENTLY AMENDED) A The method as defined in claim 14 further
2 comprising ~~the step of~~:

3 decoding an encoded value, that was encoded using the number base conversion
4 encoding algorithm and is contained in a compact-GVRP PDU message, to yield attribute
5 event information for a set of VLANs.

1 16. (CURRENTLY AMENDED) A The method as defined in claim 14 further
2 comprising ~~the steps of~~:

3 generating a GVRP PDU message containing a just_kidding message;

4 sending the GVRP PDU message containing the just kidding message out one or
5 more ports of the plurality of ports; and

6 restarting a just_kidding timer.

1 17. (CURRENTLY AMENDED) A The method as defined in claim 16 further
2 comprising ~~the step of~~:

3 entering a slow compact mode upon the expiration of the just_kidding timer and
4 the non-receipt of a conventional GVRP PDU message.

1 | 18. (CURRENTLY AMENDED) AThe method as described in claim 16 further
2 | comprising ~~the steps of~~:
3 | entering one of a slow compact mode or a fast compact mode;
4 | receiving a conventional GVRP PDU message; and
5 | reverting to a compatible mode.

1 | 19. (CURRENTLY AMENDED) AThe method as defined in claim 14 comprising ~~the~~
2 | ~~steps of~~:
3 | receiving a first compact-GVRP PDU message wherein the first compact-GVRP
4 | PDU message contains a first source identifier.

1 | 20. (CURRENTLY AMENDED) AThe method as defined in claim 19 comprising ~~the~~
2 | ~~steps of~~:
3 | receiving a second compact-GVRP PDU message wherein the second compact-
4 | GVRP PDU message contains a second source identifier that does not match the first
5 | source identifier; and
6 | entering a slow compact mode.

1 | 21. (CURRENTLY AMENDED) AThe method as defined in claim 19 comprising ~~the~~
2 | ~~steps of~~:
3 | receiving a second compact-GVRP PDU message wherein the second compact-
4 | GVRP PDU message contains a second source identifier that matches the first source
5 | identifier; and
6 | entering a fast compact mode.

1 22. (CURRENTLY AMENDED) An apparatus having a plurality of ports for sending
2 and receiving network messages to and from entities of a computer network at least some
3 of which are segregated into a plurality of virtual local area network (VLANs) defined
4 within the computer network, the apparatus comprising:

5 means for maintaining VLAN registration state for a selected port in response to
6 receiving attribute events for the VLANs;

7 means for computing an encoded value, in accordance with a number base
8 conversion encoding algorithm that encodes a plurality of attribute events that are each
9 associated with a different VLAN of a given set of VLANs into each encoded value; and

10 means for loading each encoded value into a separate field within a single
11 attribute structure of a single GVRP protocol data unit (PDU) message, wherein encoded
12 values for all of the VLANs defined within the computer network are loaded into the
13 single attribute structure of the single GVRP PDU message for transmission from a port
14 in the plurality of ports.

1 23. (CURRENTLY AMENDED) A tangible computer readable medium comprising
2 computer executable instructions for:

3 computing an encoded value, in accordance with number base conversion
4 encoding algorithm that encodes a plurality of attribute events that are each associated
5 with a different VLAN of a given set of VLANs into each encoded value; and

6 loading each encoded value into a separate field within a single attribute structure
7 of a single GVRP protocol data unit (PDU) message, wherein encoded values for all of
8 the VLANs defined within a computer network are loaded into the single attribute
9 structure of the ~~a~~ single GVRP protocol data unit (PDU) message for transmission from a
10 port in ~~the~~ a plurality of ports.

1 24. (CURRENTLY AMENDED) A method comprising:

2 maintaining virtual local area network (VLAN) registration state at a port of an
3 intermediate network device in a computer network, where a plurality of VLANs are
4 defined within the computer network;

5 grouping the plurality of VLANs defined within the computer network into sets of
6 two or more different VLANs;

7 for each set of two or more different VLANs, computing an encoded value with
8 an encoding algorithm that encodes attribute events associated with each VLAN of the
9 two or more different VLANs of the set into a single encoded value for the set; ~~and~~

10 loading each encoded value into a respective field within a single attribute
11 structure of a VLAN Registration Protocol message such that encoded values
12 encompassing all of the VLANs defined within the computer network are included within
13 the single attribute structure of the VLAN Registration Protocol PDU; and

14 transmitting the VLAN Registration Protocol PDU message ~~including encoded~~
15 ~~values encompassing all of the VLANs defined within the computer network~~ from the
16 intermediate network device to one or more other network devices within the computer
17 network.

1 | 25. (CURRENTLY AMENDED) ~~A~~The method as defined in claim 24 wherein the
2 plurality of VLANs defined within the computer network includes more than 373
3 different VLANs.

1 | 26. (CURRENTLY AMENDED) ~~A~~The method as defined in claim 24 wherein the
2 plurality of VLANs defined within the computer network includes at least 4094 different
3 VLANs.

1 | 27. (CURRENTLY AMENDED) ~~A~~The intermediate network device as defined in claim
2 | 1 wherein the VLANs defined within the computer network include more than 373
3 | different VLANs.

1 | 28. (CURRENTLY AMENDED) ~~A~~The method as defined in claim 14 wherein the
2 | VLANs defined within the computer network include more than 373 different VLANs.

1 | 29. (CURRENTLY AMENDED) ~~A~~The method as defined in claim 24 wherein the
2 | encoding algorithm is a number base conversion encoding algorithm that takes values of
3 | attribute events associated with each VLAN that are represented in a first base, and
4 | converts the attribute events into a single encoded value that is represented in a second,
5 | different base.

1 | 30. (NEW) An apparatus comprising:

2 | means for maintaining virtual local area network (VLAN) registration state at a
3 | port of the apparatus, where a plurality of VLANs are defined within a computer network
4 | of the apparatus;

5 | means for grouping the plurality of VLANs defined within the computer network
6 | into sets of two or more different VLANs;

7 | means for computing, for each set of two or more different VLANs, an encoded
8 | value with an encoding algorithm that encodes attribute events associated with each
9 | VLAN of the two or more different VLANs of the set into a single encoded value for the
10 | set; and

11 | means for loading each encoded value into a respective field within a single
12 | attribute structure of a VLAN Registration Protocol message such that encoded values
13 | encompassing all of the VLANs defined within the computer network are included within
14 | the single attribute structure of the VLAN Registration Protocol PDU; and

15 means for transmitting the VLAN Registration Protocol PDU message from the
16 intermediate network device to one or more other network devices within the computer
17 network.

1 31. (NEW) The apparatus as defined in claim 30 wherein the plurality of VLANs defined
2 within the computer network includes more than 373 different VLANs.

1 32. (NEW) The apparatus as defined in claim 30 wherein the encoding algorithm is a
2 number base conversion encoding algorithm that takes values of attribute events
3 associated with each VLAN that are represented in a first base, and converts the attribute
4 events into a single encoded value that is represented in a second, different base.